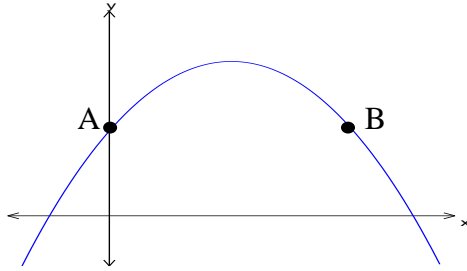


**National 5**

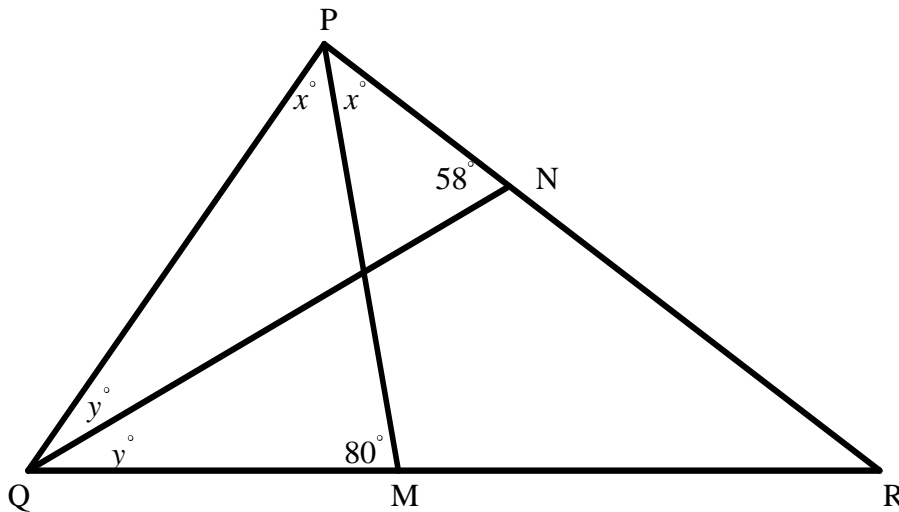
**Homework AP18**

1. The parabola sketched below has equation  $y = 20 - (x - 3)^2$ .



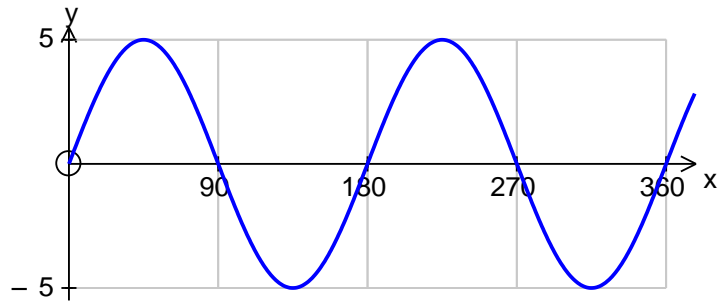
- (a) State the coordinates of the maximum turning point.  
(b) State the equation of the axis of symmetry.  
(c) A is the point where the graph crosses the  $y$ -axis, and B has the same  $y$ -coordinate as A.  
Find the coordinates of A and B.
2. In the triangle shown below,

angle  $QPM = \text{angle } MPN = x^\circ$  and angle  $PQN = \text{angle } NQM = y^\circ$ .



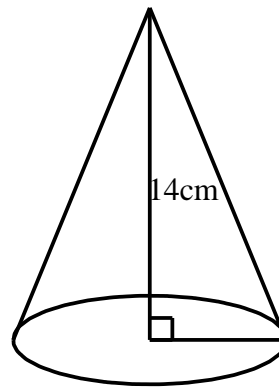
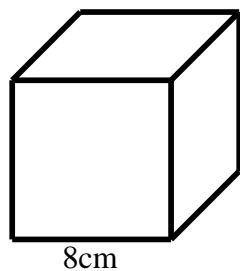
- (a) In triangle PQM, if angle  $PMQ = 80^\circ$ , explain why  $x + 2y = 100$ .  
(b) If, also, angle  $PNQ = 58^\circ$ , find a second equation relating  $x$  and  $y$ .  
(c) Find the values of  $x$  and  $y$ .
3.  $f\ x = x^2 - 2x - 2$  and  $g\ x = x + 2$ .  
Find the values of  $x$  for which  $f\ x = g\ x$ .
4. A painter mixes blue paint and yellow paint in the ratio 2:3 to get green paint, which he fills into tins containing 1 litre of green paint.  
If he has 15 litres of blue paint and 27 litres of yellow paint, what is the maximum number of tins he can fill?

5. The sketch below shows the graph of  $y = k \sin nx^\circ$ .  
Write down the value of  $k$  and  $n$ .



6. A function is defined by  $f(x) = \sqrt{x^2 + 8}$ .
- Evaluate  $f(2)$  and  $f(8)$ .
  - If  $f(2) \times f(8) = k\sqrt{6}$ , where  $k$  is a whole number, find the value of  $k$ .
  - Express  $f(10)$  as a surd in its simplest form.

7. The cube shown below has edges of length 8cm.  
The cone has height 14cm.  
If the two solids have equal volumes, calculate the radius of the cone.  
[volume of a cone is  $V = \frac{1}{3}\pi r^2 h$ .]



8. (a) Do a five-figure summary for the data shown below.
- 8      13      17      23      24      27      29      31      35      39      40      43
- Draw a box-plot to show your results for part (a).
  - Find the range.
  - Find the semi-interquartile range.

